PSYCHOLOGICAL STRATEGIES INCLUDED BY STRENGTH AND CONDITIONING COACHES IN APPLIED STRENGTH AND CONDITIONING

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ABSTRACT

This study provided the basis by which professional development needs can be addressed and add to the applied sport psychology literature from an under-researched sport domain. The current study endeavored to utilize qualitative methods to explore the specific techniques applied by the strength and conditioning professional. Eighteen participants were recruited for interview, via convenience sampling, drawn from a previously obtained sample. Participants comprised 10 participants working within the UK, 3 within the USA and 5 within Australia offering a cross section of experience from raging sport disciplines and educational backgrounds. Participants were interviewed Using semi-structured interviews. Thematic clustering was employed utilizing interpretative phonological analysis to identify common themes. The practitioners referred to a wealth of psychological skills and strategies that are used within strength and conditioning. Through thematic clustering, it was evident that a significant emphasis is on the development or maintenance of athlete self-confidence specifically with a large focus on goal-setting. Similarly, albeit to a lesser extent, there was a notable attention on skill acquisition and arousal management strategies. The strategies used by the practitioners consisted of a combination of cognitive strategies and behavioral strategies. It is important to highlight the main psychological strategies which are suggested by strength and conditioning coaches themselves in order to guide professional development towards the specific areas. Such development should strive to develop coaches' awareness of strategies to develop confidence, regulate arousal and facilitate skill and technique development.

KEY WORDS

Goal setting; Confidence; Attentional focusing; Skill acquisition; Motivation; Activation; Professional development.

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65 **INTRODUCTION**

66 A robust evidence base exists exploring psychology within applied practice settings,
67 demonstrating the importance of varying sport psychology interventions within a variety of
68 sporting contexts (37). The importance of using such skills is cemented in research into elite
69 performance, in which increased psychological skill use was observed in successful athletes
70 compared to those that are less successful (16, 60). Similarly, the importance of
71 psychological skill use in practice and competition has been investigated, with observable
72 benefits when the use of psychological skills were utilized in practice compared to
73 competition alone; performers were more successful when psychological skills were
74 employed in both practice and competition settings (14, 53). This indicates that
75 psychological skills are required to excel in sport, with the requirements to incorporate such
76 skills into practice as well as competition. Rather than innate personal characterizes,
77 psychological skills are able to be developed through both formal settings, such as structured
78 sport psychology consultation and practice, and informal settings, including coaches, team
79 mates, and support staff interactions (12, 16).

80

81 Within psychological preparation there is a plethora of research supporting the advantages
82 of utilizing psychological strategies. Williams and Krane (66) reviewed the characteristics
83 of peak performance, concluding that athletes achieve their optimal performance through
84 the use of an array of cognitive behavioral strategies. Such strategies comprised emotional
85 control, arousal control, mental imagery, goal setting, attentional control and developed
86 performance routines and coping strategies.

87

Psycho-physiological research has evidenced the benefits of psychological inventions to physiological and biomechanical variables pertinent to strength and conditioning, for example the use of mental imagery strategies which have been utilized to elicit strength gains over a six week period (32), whilst the variation of attentional focusing plays an important role in the electromyography observed and the force produced by muscle (34, 59). Therefore, it has been suggested that it would be beneficial for strength and conditioning specialists to apply key psychological self-regulatory and self-expectancy theories and concepts such as imagery, goal setting, motivation, and self-talk to their clients individualized programs (24, 25). Nonetheless, there appears to be a lack of published work evidencing the application of such skills within strength and conditioning.

More recently, Mellalieu and Shearer (38) suggested that based on the mental skills training approach it would be beneficial to use particular strategies within strength and conditioning. These consisted of goal setting, mental imagery, self-talk and techniques to regulate the activation of athlete. Such approaches align with the self-regulatory techniques identified by Holloway (24, 25) and are considered to be the 'big four' of psychological mental skills training techniques used within broader sport psychology (38). However, despite the consensus of the value of using techniques within sport psychology and the justified value of employing such techniques specifically within the strength and conditioning domain, there is a lack of research examining the particular skills and strategies that are employed by the strength and condition coach.

Recently evidence has been presented that psychological strategies are prescribed by strength and conditioning professionals albeit to differing extents (43). Radcliffe et al. (43) employed a qualitative approach which yielded data indicating that particular psychological

strategies such as goal setting were used extensively, however complex cognitive strategies such as mental imagery were used considerably less. This could imply that, at least within the strength and conditioning community, goal setting is viewed as a generic psychological skill which is readily translated into the practice domain, however it is evident that similar crossover is not observed with strategies such as mental imagery. It may be that the perception of the skill and the perceived value and application may limit the use of such techniques. Such research is encouraging as it indicates that particular strategies are being utilized, however the quantitative nature of the work presented closed responses, therefore neglecting to provide the practitioners the opportunity to divulge particular techniques or the instances when such techniques are employed which was not included within the initial questionnaire.

The present investigation aimed to explore the psychological strategies employed by strength and conditioning coaches with the intention of identifying specific strategies commonly prescribed by strength and conditioning coaches. While not to distract from the exploratory nature of the work, the present study hypothesized that, in line with previous work (43), there would be an imbalance in the modes of psychological skills prescribed and strategies to such as goals setting will be widely used in comparison to lesser prescribed complex cognitive strategies such as mental imagery.

METHOD

Experimental approach to the problem

In order to answer the aims of the current research question an ideographic approach was adopted where by each individual case was examined in detail prior to the amalgamation of key concepts resonant across the sample. The approach utilized semi-structured interviews, transcribed verbatim, which were analyzed for key resonant themes using interpretive phenomenological analysis (IPA: 48). Such a design is applicable when examining topics centered on lived experiences where standardized research instruments may prevent the collection of relevant data (54). Furthermore as stated by Tod et al. (54) the use of qualitative methods employing semi structured interviews hay proven successful in answering psychology orientated research questions within strength and conditioning.

Ethical approval

Before commencing the study, the University Institutional Review Board provided ethical approval for the experimental procedures. Prior to participation all subject received an invitation email containing participant information including clear explanation of the potential benefits and risks associated with the research, how the data will be handled, the dissemination of findings, and voluntary nature of the study. An email contact was provided for the lead investigator should any potential applicants request additional information.

Participants

Eighteen participants were recruited for interview. The present study employed convenience sampling drawn from a previously obtained sample pool initially compiled through purposive sampling. Additional snowball sampling was used as it is regarded as an effective

method to enlist potential participants and compatible with the concept of purposive sampling. Participants comprised 17 males and one female. Of these participants, 10 participants were working within the UK, 3 within the USA and 5 within Australia. Each was accredited by the National Strength and Conditioning Association, the United Kingdom Strength and Conditioning Association, the Australian Strength and Conditioning Association, or a combination of dual accreditation. The participants provided a cross-section of experience working as strength and conditioning practitioners, ranging from two years to over 20 years within various sport disciplines. All participants had experience working at a minimum of national level.

Procedure

Interviews were conducted at a mutually-agreed time and location with specific consideration of time zone differences and typically lasted between 40-80 minutes. Data was recorded using digital voice recorder (Olympus, VN-5500PC), and transcribed verbatim. Interviews were conducted over the period commencing October 2011 to January 2012.

The semi-structured interview schedule was composed and scrutinized by one specialist from each of the disciplines of psychology and strength and conditioning for content validity. The questions explored the individuals' narrative of their experience being a strength and conditioning coach. The purpose of psychology and the perceived importance of psychology within strength and conditioning were questioned. The methods of skill use and perceived barriers to using psychology were also explored. The questioning was open ended to allow elaboration around personal professional development and to promote participant narrative.

186 **Analysis**

187 The analysis employed interpretive phonological analysis (IPA:Smith & Osborn, 2003)
188 conducted with NVivo 9 (QSR International Pty Ltd., Victoria, Australia) software to
189 identify common themes.

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191 The researcher transcribed all interviews verbatim. Adhering to IPA guidelines (49) the
192 transcripts were read sufficiently to provide an in-depth familiarization with the data and
193 specific context of the data. Considering specific questions, each transcript was analyzed to
194 highlight specific instances within the participants' accounts. During first stage analysis,
195 Nvivo 9 assistive software (QSR International Pty Ltd., Victoria, Australia) was used to
196 extract pertinent notes for the participant narrative. Notes were then compiled to form
197 thematic emergences after which the themes were reviewed for confirmation of
198 understanding within the contexts outlined during the narrative. This procedure was repeated
199 for the remaining transcripts with the application of an evolving 'master template' guided
200 through emerging themes used to focus the analysis (4).

201

202 Commonalities were explored between transcripts. This resulted in the development of
203 higher order themes with appropriate supporting quotes identified. In instances where quotes
204 failed to sufficiently evidence themes, the theme was removed from analysis (4).

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208 **RESULTS**

209 The practitioners referred to a wealth of psychological skills and strategies that are used
210 within strength and conditioning. There were 130 references made to the use of specific

psychological strategies from 16 of the 18 practitioners. Through thematic clustering, it is evident that a significant emphasis is on the development or maintenance of athlete *self-confidence*. Similarly, albeit to a lesser extent, there is a notable focus on *skill acquisition* and *arousal management*. In addition to this the strength and conditioning practitioners made reference to the manner in which the psychological strategies are applied within the strength and conditioning domain. The results will address two global themes identified; the specific skills used and the methods in which psychology is integrated within strength and conditioning practice.

The emergence of such themes is evidenced by both the frequency of emergences of concepts and also the resonance, the specific individual meaning, on an individual level. The emergence of such themes is evident in the cluster diagrams demonstrating the prevalence and resonance of specific strategies within overarching themes (Figure 1).

Confidence building

The most prevalent theme that emerged was that of the importance of nurturing a confident athlete. This was predominately via the use of goal setting however application of concepts surrounding self-efficacy emerged. Each of the dominant themes relating to enhancing the confidence of the athlete will be discussed in the subsequent section.

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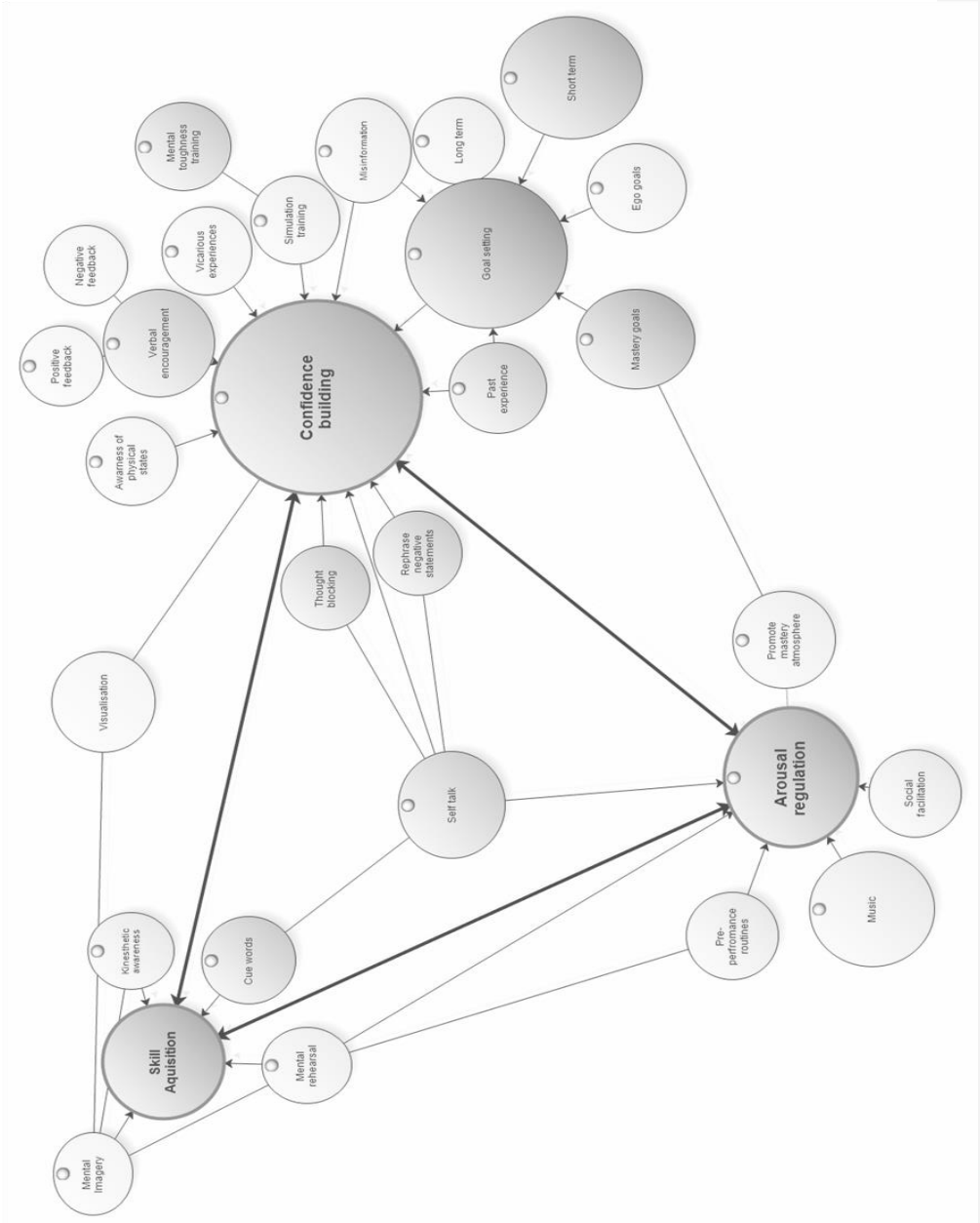

Figure 1 Thematic emergences depicting the integration of psychological skills within strength and conditioning. Resonance is indicated by size.

Higher order themes	Lower order themes	Sub themes
Confidence	Goal setting	Short term goals
		long term goals
		Athlete agreed goals
		Lack of athlete control
		Mastery orientated goals
		Ego orientated goals
	Emphasising accomplishments	
	Simulation training	
	Learning to fail/managing expectations	Emphasising process/mastery objectives
	Misinformation	
	Verbal Persuasion	Positive feedback
		Negative feedback
	Vicarious experiences	
	Imagined experiences	Visualisation
		Mental imagery
		Mental rehearsal
		Internal perspective
		External perspective
	Self-talk	Rephrase negative thoughts
		Thought blocking
Arousal regulation	Reducing arousal intensity	Mastery goal setting
		Pre-performance routines
		Music
	Increasing Arousal intensity	Social facilitation
		Pre-performance routines
		Music
Skill acquisition	Self-talk	Technical cueing
		Focus attention
	Mental Imagery	
	Kinaesthetic awareness	

Figure 2 Thematic emergences depicting the most prevalent resonant higher order and lower order themes

Goal setting was the most resonant theme within the overarching higher order theme of enhancing athlete confidence. The use of goal setting received considerable attention within individual narratives with 15 of the 18 respondents referring directly to the use of goal setting or synonyms such as ‘target setting’.

Specific emphasis was provided to utilizing short-term goals. The formal strategy of goal setting was focused around the use of short-term targets whereas there was an informal attitude towards the inclusion of long-term goals.

> *"The goals that we set would be more short-term although we would discuss longer-term goals with them. But in terms of formalizing stuff, the majority of goals will be shorter term goals"*

The concept of differing level of importance, evidenced through formal recognition, indicates that there is a greater importance placed on the use of short-term goals compared to long-term goals. This was also evident in the emphasis of short-term goal setting through the participant narratives. Overall, considerably more emphasis exists on the use of shorter term goals compared to long-term objectives.

This was especially evident when providing frequent senses of achievement when shaping the development of technical skills.

> *"Yeah they're pretty good. We keep reminding the athletes of those [short-term goals] so they've always got them in their mind and they know what they want to achieve and we know the stepping-stones towards that."*

Aligned with self-efficacy theory (6), short-term goal setting provides frequent opportunities to experience achievement (17) and consequently short-term goal setting can prove a powerful tool in facilitating the self-confidence of the athlete. In addition to benefiting the athlete self-efficacy frequent goal setting can serve as an effective motivational tool. The use of short-term goal setting was indeed perceived to be a method of increasing the athletes' motivation.

There is evidence that the athlete input in the development of training objectives can range from extremely limited athlete contribution through to a considerable athlete input. Nevertheless, the importance of athlete input when designing goals and programs was

resonant through the practitioner narratives biasing towards the suggestion that involving the athlete in the generation of psychological strategies appears beneficial for training adherence.

> *"That's going to help their adherence. I have for them and agree goals and set the goals so when they're going to train and how they are going to train and where they are going to train and they just turn up"*

In addition to the specific inclusion of goal setting, there was evidence that strength and conditioning coaches were specifically referencing the athlete's previous accomplishments

> *"…if say they have done a certain weight before you have done this in the past this is nothing. It will be an easy lift, so reverting them back to a previous instance they have had success in and bringing that into the current session would be a good way."*

The use of previous accomplishments aligns strongly with self-efficacy theory. Indeed, past performances are the greatest source of self-efficacy as they are grounded in the athlete's own experience (6). Various empirical sources support the effect previous experiences have upon self-efficacy (see 47 for review).

A prime role of the coach in providing opportunities to experience success would be through the use appropriate goal setting as previously discussed. In order to provide a sense of achievement there is evidence that strength and conditioning coaches are utilizing misinformation strategies by which the athletes are misinformed as to their actual performance.

> *"Used to train a lot with training partners people who would say 20kilo Olympic bars that you are lifting and then some training sessions would come back through saying they would of loaded it with a 25kilo Olympic bar still doing the same sort of stuff you are lifting it a little bit extra doing very similar reps and then finding out later that you been had [laughs]."*

The reference to false feedback has previously been documented within self-efficacy literature and with particular relevance to strength and conditioning practice. For instance

informing the athlete that they are lifting a lower weight than they actually are the task is perceived as less challenging and subsequently more readily achievable to the athlete. As a result the athletes' self-efficacy and subsequent lifting performance has been demonstrated to improve (13, 64). It should be noted however that caution is warranted when utilizing such a strategy, not least because of the danger posed to the trust between athlete and trainer (7) and also the ethical concerns regarding the potential risk of injury without having true informed consent of the athlete.

Within the narratives, the importance of verbal persuasion is a resonant theme comprising motivational and confidence enhancing benefits.

> *"Make them focus on what they are actually there for which is good performance it's just to try to from my part not focus on the negative but say actually you are really good at this, this can be improved"*

There was evidence of positive performance feedback and verbal encouragement. Thus it was evident that the strength and conditioning environment is one in which required considerable encouragement and persuasion. Nevertheless, it would appear that such a view was not universal within the strength and conditioning community. Some strength and conditioning practitioners employ negative feedback

> *"I think it, and this is one thing I struggle within the S&C world is that we point out a lot of things that they are doing wrong, that they are not strong enough they are not flexible enough, they are not all these things … I think it is absolutely utterly, I don't think it is right"*

It is apparent that within the individual's experience, within strength and conditioning practice, there is the tendency to neglect positive reinforcement and focus upon the negative. Whilst it is important to correct techniques it is apparent that specific feedback practices are inconsistent across the strength and conditioning community. Such a perception is important, especially as the debilitating effects of verbal persuasion are more powerful than the facilitative effects brought through persuasive communication (7).

It is evident that the coach is aware of the athletes using visualization and the relationship between visualization and confidence, however equally it is clear that there is little input from the strength and conditioning coach into the style of mental imagery employed rather it is self-selected by the athlete.

> *"I know that a lot of my athletes, to keep their self-confidence up, sometimes use alternative methods where they may do some visualization work."*

Visualization is one component of the psychological skill termed mental imagery. Mental imagery encompasses a spectrum of imagined sensory inputs in addition to the imagined visual stimuli with qualified sport psychologist practitioners attempting to foster an imagined holistic sensory experience utilizing an increased numbers of imagined sensory and emotional inputs. Originally considered part of vicarious experiences (6, 7), imagery has since been considered an independent source of self-efficacy (47).

There is evidence that the coaches are aware of the potential effects of self-talk. This is evident with coaches instructing individuals to use positive statements to prevent attention being focused on negative thoughts.

> *"I definitely just direct people to not dwell on negative aspects - only positive statements, there is no set formula there is no set words, whatever works for you work of something that you are trying to achieve or is a positive thing for yourself. It's just no negative conversation within the place."*

It is evident that the attentional focusing mechanism can govern self-confidence by inhibiting focus upon cognitions detrimental to confidence. The lacking specificity of self-talk strategies acknowledges the need for individual specific strategies Thus, the use of self-talk may be an important strategy to prevent attention being directed towards maladaptive

cognitions. Indeed, the requirement to focus attention is regarded as a commonly cited use of self-talk (20) demonstrating positive effects on concentration (58).

Arousal regulation

Arousal regulation strategies received significant emphasis within the participant narratives with both elevations and reduction strategies described. The importance of regulating arousal is evident throughout, with practitioners indicating that rather than being a linear relationship, there is an optimal point in which arousal intensity facilitates performance.

> *"Arousal is what people who are unskilled call psych up. We look at the inverted U arousal and skill. The lifts we use for the major strength needs high level of arousal when we lift heavy so we have certain strategies that we use at my club that if someone is lifting maximal effort weights"*

It is also evident that strategies are being employed to reduce or elevate arousal. The use of arousal elevating strategies within strength and conditioning has been a well-researched area (36, 55, 56) however as yet there is a lack of consensus regarding the benefits of utilizing such a technique. Interestingly it is implied that, across the strength and conditioning professional field, there are inconsistencies in practice. The specific reference to the "unskilled" and "psych-up" indicates that there are strength and conditioning practitioners who are only aware of the need to elevate arousal and it is only the skilled coaches who are aware of the need for downwards regulation. The notion that the ability to regulate arousal both up and down is a distinguishing factor between skilled and unskilled strength and conditioning coaches.

Initially the equivocal results of existing research are surprising given the significant attention offered to 'Psych-up' within the narratives. However the fact that that the

practitioners are moderating arousal rather than simply elevating suggest that there is an optimal level of arousal depending on the activity

> *"You don't learn that fine motor skill like throwing if you go nuts, you can't so I talk about throwing motivation and football motivation take it down, let's be little bit more calmer, let's be a little bit more methodical with the approach an little bit more thoughtful. Don't just go nuts in motivation because when you go nuts in motivation that technique can, not always but it can get out of whack so the timing of the throw becomes a problem so we got get ourselves, reign ourselves back in to throwing motivation rather than football motivation"*

The example uses arousal and motivation interchangeably and notes the different types, or levels, of arousal required for different behaviors. At an implicit level the term "go nuts" suggested that, despite the understanding of appropriate levels of arousal, the use of arousal regulation strategies is unstructured and devised by the athletes themselves with little specific technical input from the coaches.

Although not directly referred to, the use of goal setting is considered a regulatory strategy with regard to reducing training stress. Goal setting was widely reported to be centered on mastery goals in which the individual athlete appraises performance against self-referenced targets. One such example did reference the effect of goal focus has upon the performance.

> *"Occasionally someone gets too hyped up if it's a new weight they go up more and then they get over aroused and their technique falls apart and we have to bring them back so we bring the weight back and concentrate on technique that gave success."*

The present example characterizes the emphasis on the technical execution and movement form, termed process goals, rather than the actual performance outcome of the lift, thus termed performance goals (29). The emphasis towards the process goals has been reported to benefit performance over a season long intervention, with improvements attributed to factors such as increased self-efficacy and a greater control of cognitive anxiety (30).

> *"So again if you take weightlifting as an example, when an athlete is learning to weight lift if they are very focused on the outcome goal of getting the bar from*

the floor to above their head than they will tend to lose the mechanics of the lift."

Through focusing attention on the technical mechanics of the lift there is an emphasis on processes that would likely reduce the goal importance and subsequently be less stress provoking (52). Whilst not universally established, the mechanism responsible for the reduced performance stress is hypothesized to be owing to the level of control the individual can possess over the outcome of the performance (26).

There was evidence for the use of pre-performance routines prior to skill execution. The present example emphasizes the use of both cognitive and behavioral preparatory strategies in which the athletes are instructed to perform both breathing and visualization strategies to regulate arousal intensity.

"I've tried just some sort of mental relaxation so that before we go out to throw we do some breathing exercises. Do some relaxation exercises and some mental feedback, you know biofeedback type stuff just lying relaxing, visualization, visualizing the throw."

Pre-performance routines have been suggested to benefit performance through regulating arousal to the optimal threshold and focusing the athletes attention to the relevant cues associated with the skill execution (8, 63). The present example typifies how such requirements are achieved through cognitive, bodily, and behavioral interventions.

There is evidence to suggest that the strength and conditioning coaches are utilizing music to manage levels of arousal. This can consist of reducing arousal and then, through modifying the type of music, increase activation to the appropriate level at the appropriate time.

"We live 60 km from [city], what we have, over the years, encouraged our teams to the iPod™ so they have a selection of relaxing music that they would play in the bus on their way to the event and when they are warming up."

Music has been shown to manipulate emotional states to alleviate anxiety and result in a relaxed state (9). Such a mechanism for regulating arousal is hypothesized to be aligned with Rajeski's (44) Parallel Processing Model through which attentional capacity is switched to the music stimulus and thus away from anxiety provoking cues. Music has previously been demonstrated to enable the athlete to disassociate away from unpleasant sensations, in particular at low work intensities (11). Music has previously been credited with the ability to alter psychomotor activation, serving as either a stimulant or sedative (28). Such psych-up strategies have long been endorsed by reviewers, however equivocal experimental conclusions exist, predominantly due to the idiosyncratic nature of music preference (28).

It is also evident that music is being used in conjunction with other psychological strategies

> *"We also use a bit of music but we tend not to let the guys walk around the space like the transitional area with iPod™ in. We like them to soak up the atmosphere and realize that they here for an event but when it comes time to visualize which is usually about, we like to give it about 30 min before a race we let them go away just by themselves to listen to some – not big heavy music it's more everyone got their own play lists so they listen to that for a couple of minutes and they come back out and start warming up."*

Such an example supports previous work in which the use of music has been suggested to aid the use of mental imagery, thus serving as a valuable pre-competitive routine (28). Furthermore, the use of music has been found to increase the effectiveness of imagery strategies when performing a strength endurance task compared to the use of mental imagery alone (27).

There is evidence that the practitioners are manipulating the training environment to manipulate the levels of arousal that the athlete may face.

> *"I think to psych them up if you are going to attempt a personal best in the gym the music stops and it is like all eyes on you and it sort of heightens you up a*

little bit so that is a way we sort of spike arousal perhaps. It's an interesting way of going about it but it is like lights are on you almost."

The audience effect is a well-established concept in which the presence of others influences the arousal experiences by the individual (71). Typically, in the presence of others, performance is facilitated should the task be well-learned, yet inhibits performance should the skill be difficult (50, 71).

Skill Acquisition

The narratives of the strength and conditioning coaches revealed that of the strategies used, there was an emphasis on attentional focusing strategies to aid skill acquisition. This comprised of the use of self-talk to provide technical cuing, the use of mental imagery as mental rehearsal, and an emergent theme was the use of strategies to improve the kinesthetic awareness of the athlete.

Despite self-talk being heavily used for motivational and confidence purposes, there is evidence to suggest that self-talk is being employed as a behavioral mechanism to shape technical skill execution. This includes the use of self-talk to for technical cuing.

"So it's more to embed coaching cues a little bit … so rather than me saying it over and over is to get them to say it so they know what their one technical or their one cue during that lift would be to switch core on. To make sure you know I kind of find it helps it sink in more; they might get sick of my own voice so I like to use self-talk for that."

The use of such a strategy to regulate technique and skill acquisition is in agreement with the emphasis which sport coaches place on technical execution (21). However such behavioral functions of self-talk are relatively under explored within the academic setting (21). Nonetheless technical cue words have been effective in facilitating motor skill acquisition (1, 31). It should be noted that evidence exists suggesting that technical

execution would be improved through the use of cues to focus attention externally with regard to both power output, improved muscle activation efficiency, and movement economy (67, 70). The additional cues are thought to promote conscious interference to the determent of automaticity when executing the skill (68) .

> *"So we have key cues that we use on a lot of exercises, so a back press can be chest up, body tight blast off the chest drive with the arms we give them those cues and then as the bar is coming down we will say "blast" on the way up say drive to your eyes, eyes, eyes, eyes, and obviously blast at the bottom, explode. So if we can get them to focus on those thinks but one think at a time or one or two key things"*

The present example supports the notion of instilling an external focus of attention using cue words. Such an approach utilizes individual words that are representative of the movement kinetics such as "blast" that is associated with rapid and forceful movement. Such an example is indicative that coaches are not providing excessive instruction regarding desired movement coordination, rather, using cues which associate with the desired kinetic outcome. Noticeably the use of reduced cues was regarded as beneficial when refining the athlete's technique.

> *"So if we can get them to focus on those thinks but one think at a time or one or two key things. Whatever they need to do. And just focus on what is important and away from what is not important."*

Such an approach is particularly relevant when shaping a skill, as according to human performance models of information processing (2) there is a limited capacity to attend to information and as such coaching information should be limited to emphasis only the most important elements to avoid the danger of "paralysis by analysis" (2). Such examples have previously been evidenced by which the addition of supplementary technical instruction has failed to facilitate (23) and inhibit skill execution (69).

The use of visualization received attention in which mental imagery techniques are integrated into a pre-performance routine.

> *"Visualizing the throw. Think about where you want to place your left leg, where do you want to place your right leg and I know [that] in certain situations there are people who can feel it and people who can visualize it. And usually it is the people who can feel the throw who are your good throwers not just being able to visualize what they are doing. They feel like they are inside the throw rather than looking at the throw from outside so we talk about that."*

The use of mental imagery aligns with attentional focusing theory that states the individuals must deliberately concentrate on the desired outcome or the required processes (39). This preparatory strategy is likely to direct the attention towards the relevant cues required for successful skill execution. Such a hypothesis exists in support of the use of mental imagery to focus attention (62).

There was emphasis provided to the use of kinesthetic indicators or performance when developing skills; that is the muscular and proprioceptive feedback associated with becoming more adept at the skill execution.

> *"Technique. Whether it feels good and should feel the sweet spot. So you feel the spring it is not a grind it should be fluid."*

During skill acquisition, the knowledge of performance provided by intrinsic feedback, in this case kinesthetic awareness of the movement, is a valuable source of information from which to shape motor programs (72). The strength and conditioning coach suggests that in addition to broadly used augmented feedback the athletes are encouraged to attend to the intrinsic feedback gained from performing an action.

Mechanisms for including psychological strategies within strength and conditioning

Integrated during the session

In examining the methods in which psychological strategies are included it is important to determine the mechanisms for including psychological strategies. Thematic analysis

indicated this can take two positions, either a purposeful blocked-out period during the training session or an unstructured spontaneous approach.

> *"We'll spend some time I guess a little bit of blocked out time initially where we talk a little bit about the psychological cues that we are wanting to introduce in the same that we would introduce a training session with agility and talk about the aims and the goals of the session we try and integrate it into the physical side so a lot of concentration, like during the warm up for example"*

It is worth noting the development of the psychological skills and the opportunity provided to practice the skills during a warm up rather than even during the training itself. Such findings would suggest that the strength and conditioning coach is adopting an active role in suggesting psychological strategies rather than adopting a passive role in supporting such skills only when they become apparent. However there was considerable evidence that psychological skills and strategies are utilized in a spontaneous manner.

This particular respondent typifies the responses of other coaches suggesting that the use of psychological strategies are used predominantly in an unstructured manor within the strength and conditioning physical session, as and when they are needed.

> *"I'd see that as a little bit more of the psychological side coming into effect you know pre-lift routines those kinds of things, using visualisation and self-talk, it's all integrated rather than being a separate session"*

The scope to practice psychological skills is encouraging; however the unplanned nature of the psychological skills could suggest that the limited attention is afforded to the development of psychological skills within strength and conditioning.

Making particular reference to the educational stage of psychological skill development, one individual alluded to the spontaneous manner in which sessions targeting psychological development occur.

> *"I don't think I have any educational sessions but you know I am quite happy to sit and chat in the middle of a session or you know at the right time my practice will always be in a session but I am not unhappy if I don't do a lot physical training in that session."*

The quotation summarises the unstructured and informal approach to applying psychological skills within training, but also~~however~~ acknowledges the value of psychology within strength and conditioning to the point of sacrificing physical training. ~~It is unclear the~~ The extent to which such an approach caters for the reinforcement of psychological skill use in practice is unclear and evidences a polar approach to the systematic development of psychological strategies.

Dedicated session

There is evidence that there are individuals who are utilising dedicated sessions to facilitate the psychological skills of the athletes.

> *"It would be a dedicated sit down session. Then the next one would be a goal setting session where we like I say go into the long term, medium term and daily actions that they can do so it would be half an hour of maybe one session that we could go thorough certain goals and targets that they want to achieve."*

Such an approach is less common than the use~~employing~~ psychological strategies as an integrated part of strength and conditioning training. Nonetheless, it is evident that the specific psychological strategy is likely to influence the method ~~or~~ of integrating psychological skills either as a standalone session or integrated within the physical training session.~~. .~~ For example, it is evident that coaches are integrating specific attentional focussing techniques and motivational approaches within the strength and conditioning session.

> *"Well in the way I do it is not separate. I give them motivation, goal setting reinforcement, it's just in our sessions, we teach players how to cue and give the cues, technical cues to their training partners"*

However, specific cognitive strategies are also used during sessions but are separated from the physical aspect of the training.

> *"The self-regulatory and the cognitive function stuff that would be separate from the physical stuff, you know you might do that at the end when you have finished."*

This would suggest that in distinguishing the two approaches the practitioner appears to be attempting to equip the athletes with psychological skills yet does not appreciate the application of such skills within strength and conditioning rather that they are attempting to equip the athlete with transferable skills applicable within the wider sport performance context.

Level of athlete involvement

Concerning the involvement of the athletes in the development of mental strategies, the narratives of the strength and conditioning coaches suggest that such discussions occur in a variety of ways. Coaches are engaging athletes in the discussion making process with the athletes in a structured and premeditated method.

> *"It would be a dedicated sit down session."*

> *"…that would be a separate session at the beginning of the pre-season…"*

Alternatively, strength and conditioning coaches engage using informal sporadic and spontaneous discussion.

> *"Not really only through discussion. Again a lot of it to me is an education a lot of them are using these psychological skills without them realising so whether I use the terminology as self-talk or just have a discussion about internalising certain messages to motivate or to clear their minds or what have you then it is more of an informal conversation rather than saying you know this is a particular skill that your using and I want to measure the benefit its giving you."*

The narratives provide evidence that the athlete input can range from extremely limited athlete input through to a considerable contribution. Nevertheless, throughout the narratives

there is ~~there is~~ an emerging theme that ~~that~~ involving the athlete in the generation of psychological strategies is beneficial for training adherence.

> *"It's usually a number of questions that I fire out to them so they actually take ownership on how they wish to do it themselves. I don't say "hey, look you have got to get your arousal down" because that's telling them something and most people won't respond to someone telling them something"*

> *"It's more or less sticking with what they want for their goals and asking them what goals are relevant to them"*

Intrinsic motivation is fundamental to promoting athletes to develop psychological skills and strategies. Therefore, the sense of initiative when devising training requirements is fundamental in providing the intrinsic motivational requirements to engage with the training program. It is evident that coaches engaging with the athletes concerning the use of psychological skills however it is also evident that coaches are withholding information to suggest the use of psychology; instead, the coaches integrate psychological strategies without the athlete associating the use of psychology within strength and conditioning training.

> *"And that rather than psych being explicit within those settings that it is implicit that it is included as part of behaviour and that the athlete isn't necessarily aware that we are doing this for our psych, or we are doing that about our arousal, or we are doing goal setting that actually they are just good behavioural practices that are imbedded in the S[strength] and C[conditioning]"*

Such an approach would suggest that the perception exists amongst some coaches that it would be detrimental for ~~the~~ athletes to be aware that they are engaging with sport psychology practices within strength and conditioning settings. This notion would align with the concept that athletes exhibit a negative attitude towards with the use of psychology and the strength and conditioning coach, although aware of the benefits of psychology, are implementing such skills covertly.

DISCUSSION

The present study endeavored to ascertain the range of psychological skills and strategies that are being employed by strength and conditioning practitioners. It was apparent, via the use of thematic clustering, that the strength and conditioning coaches directed attention to three main areas. These comprise nurturing confidence, regulating arousal, and strategies to facilitate skill acquisition. Whilst not to distract from the qualitative and naturalistic nature of this article it is significant to identify that of the major themes, facilitating self-confidence was the most prevalent within the narratives of the coaches.

The perceived importance of self-confidence to strength and conditioning has previously been documented, with strength and conditioning practitioners regarding the motivation and self-confidence of athletes as most important characteristics (42, 43). The current research would endorse such a view and it is unsurprising that the strategies perceived to be the most important received the greatest emphasis regarding the prescription of psychological strategies. Despite the consensus regarding the importance of a skill and the resonance of strategies to facilitate that skill, there are inconsistencies between the results observed in the

687 present study and in previous research (42, 43). Specifically the use of strategies to develop
688 self-confidence has previously been documented as ranking low in comparison to other
689 strategies, receiving only moderate use (42, 43).
690
691 Within the present study, goal setting received considerable attention within the participant
692 narratives. The current qualitative study, with scope to include context on the analysis,
693 suggested that the manner in which goal setting is used would imply that goal setting is a
694 key strategy used to facilitate the global construct of self-confidence. For example, research
695 has demonstrated that short-term goals are amongst the most commonly utilized
696 psychological strategies in athletic training (65) and physiotherapy (3, 4), whilst the
697 academic community suggest variations in goal setting strategies can account for athletic
698 performance differences (12, 41).
699
700 Work has previously identified that long- and short-term goals used in conjunction resulted
701 in a better performance than would occur should either strategy be used singularly (33). This
702 was predominantly owing to the vague nature of the long-term goals providing little
703 motivational impact within the here and now (61). Despite the widespread support for the
704 effectiveness of goal setting compared to no goals, or a simplistic 'do your best' goal (51),
705 there is a relative paucity of literature examining the optimal mechanism for integrating
706 short and long term goal setting strategies (29).
707
708 Advantages of proximal goal setting relate to the increased controllability of short-term
709 goals in which modifications can be made to ensure that the goal difficulty is appropriately
710 challenging, whilst distal goals provide a direction in which to strive. The benefits of short-
711 term goals are suggested to be related to the extent that proximal goals serve as an effective

712 feedback tool which offer frequent opportunities for participants to sense achievement (17).
713 Such a suggestion aligns with the mechanics of self-efficacy, that previous accomplishments
714 are the greatest moderator of athlete's self-efficacy (6). Equally, comparisons with distant
715 aspirations have the ability to destabilize self-efficacy and motivation should the disparity
716 between the goal and the current level be perceived as failure or insufficient process (18).
717
718 A comparison between the present investigation and earlier research concerns the use of
719 mental imagery. Previous research has identified that mental imagery is neglected in relation
720 to other psychological strategies (3, 4, 42, 43). However, the present study demonstrated
721 that strength and conditioning coaches are proposing utilizing mental imagery techniques to
722 benefit both athlete confidence and skill development and execution. It should be noted that
723 despite being ranked low in previous studies with regard to other strategies (42, 43), mental
724 imagery strategies were still utilized a moderate amount. Reasons for the infrequent use of
725 imagery strategies have been suggested to be a lack of perceived importance and difficulty
726 in prescription of strategies (19, 65). However, despite limited references to kinesthetic
727 'feeling' being noted, imagery references were predominantly focused on the visual
728 component of imagery. Such an approach would indicate that there is still a considerable
729 lack of understanding regarding the application of mental imagery.
730
731 The difficulty in prescribing mental imagery strategies is reflected in the current study in the
732 misunderstanding of what constitutes mental imagery. That is it was apparent that
733 practitioners were, with a few exceptions, utilizing only the visualization component of
734 mental imagery. Thus it is likely that as well as difficulty in prescribing mental imagery
735 techniques, the lack of knowledge would render such techniques ineffective and therefore
736 reduce the likelihood of the practitioner pursuing such an approach.

737

738 An emphasis on the use of arousal inducing strategies was expected due to the fact that many
739 athletes attempt to elevate arousal levels prior to lifting (56); strength benefits from
740 employing arousal inducing strategies are observed (46, 56, 57). However, it was evident
741 that an optimal level of arousal existed, beyond which performance would deteriorate.
742 Consequently, strategies were reported to both elevate and reduce levels of arousal. The
743 prominence of arousal regulation strategies, whilst expected does not reflect previous
744 findings in which only a small consensus of strength and conditioning practitioners reported
745 that 'arousal' was important. Interestingly, the need to relax was regarded as important by a
746 larger proportion of practitioners (43) whilst the detrimental factor of inappropriate arousal
747 was similarly documented (43). This would imply that rather than simple elevation of
748 arousal, the practitioners perceive it is important to tune arousal to the appropriate level
749 specific to the task and the individual. This notion was supported by the description of
750 techniques to both reduce and increase levels of arousal.

751

752 The final prominent higher order theme was the use of strategies to aid in the acquisition of
753 skill. This comprised instructional self-talk, mental imagery, and emphasis of kinesthetic
754 awareness. The use of such strategies fulfils key roles in the skill acquisition process. When
755 learning and executing a skill there is a proposed finite attentional capacity that can be
756 afforded to external and internal cues, therefore, preparatory strategies are important in
757 focusing attention towards the cues most relevant for the task execution. The use of effective
758 attentional strategies can reduce the time taken to learn new skills (35). One reason is that
759 self-talk and preparatory imagery could serve as strategies to facilitate prior identification
760 of the most pertinent task relevant cues.

761

In developing autonomous actions, it is important that the athlete develop awareness of what the movement should feel like. Termed the image of action (45), this motor image governs the extent to which immediate fine adjustments can be made to movement characteristics. In developing the image of action, it is important that the athlete is able to provide self-reinforcement of what the movement should feel like. Such specific feedback, the knowledge of performance, is based on kinesthetic feedback (35). It is therefore encouraging that strength and conditioning coaches are employing strategies to direct attention to the kinesthesis of the movement however, the consensus offered little evidence of the widespread use of strategies to aid in motor skill acquisition.

The large emphasis on cognitive and behavioral strategies to promote confidence and regulate arousal is indicative that such strategies are important within strength and conditioning practice. It is however interesting that a relative paucity of skill acquisition strategies were presented. Such a lack of psychological strategies to facilitate in skill acquisition is surprising, not least because one of the prime responsibilities of the strength and conditioning professional is the teaching of exercise technique (40). Furthermore, strength and conditioning coaches have been documented to spend the majority of their time teaching correct techniques (10) and providing instruction during performances (15).

It is interesting that within the present study there is an apparent under-representation of skill acquisition strategies. It may be that with the apparent focus on the psychological constructs of confidence and motivation of the athlete (43), the strength and conditioning coaches in the present study were more aware of specific techniques to influence confidence. Similarly, the regulation of arousal, often termed ‘psyching up’ (46, 55, 57), is by name association a psychological factor. It is therefore possible that the majority of the

practitioners will not have associated skill development as a psychological factor within strength and conditioning and thus naively withheld information. Such a conclusion would indicate that there is a lack of understanding regarding the total role psychology can play within strength and conditioning. Additionally it is possible that a lack of understanding around the mechanics of skill acquisition, which go beyond the use of basic use of instruction, would provide greater scope to develop the instructional skill set of the strength and conditioning coach and is an area worth of focusing coach development programs.

When examining the specific psychological strategies it was important to explore how specific strategies are integrated into strength and conditioning. This approach included the specific timing of psychological interventions and the level of athlete input in development of applicable psychological strategies. The involvement of the athlete in the decision making process is a critical component with regard to motivational consequences, especially pertinent as motivation is regarded as the most important of all psychological constructs within strength and conditioning (43).

Such an awareness of the need to include the athlete in the planning stages of psychological strategies is encouraging, with a bias toward the inclusion of the athlete rather than ~~forming~~ developing and prescribing strategies independent of athlete input. It is apparent that the instances when the athlete is not party to psychological techniques and the associated rationale for such strategies is owing to the perception that the athlete would respond negatively to the inclusion of psychology.

The spontaneous integration of psychology within sessions was prevalent amongst coaches, indicating an unstructured view towards applying psychological strategies within strength

and conditioning. Such an approach is polar to the recommended systematic education and acquisition of psychological skills and as such is likely to be a sub-optimal approach. Nevertheless the application of psychological skills during training is encouraging with regard to the association between skills use in practice and skill use during competition (16, 14). The spontaneous inclusion of psychology is likely to be ~~owing~~ due to the lack of time available with the athlete. With demanding time constraints, it is likely that the physical training takes precedence. A second potential reason would comprise the perceptions of the practitioners and the myth the psychological skills can be quickly acquired and provide quick fix solutions.

An interesting observation concerning the methods of including psychological skills training was that particular skills were introduced away from the training session, yet others were introduced during the strength and conditioning setting. This would indicate that particular skills are suited to being integrated during the training session ~~whist~~whilst others may be better suited to be ~~introduces~~ introduced away from the training setting. for example, goal setting was the most used strategy away from the training environment.

It is noteworthy to suggest that as goal setting has previously been identified as the most frequently utilised technique (43) coaches have greater awareness of utilising goal setting techniques in a variety of settings whilst the incorporation of other techniques are still in relative infancy. Consequently, the coaches may be naive as how particular techniques can be introduced or promoted away from the immediate physical conditioning setting. This highlights the need for professional development work to be provided to develop the awareness of the use of psychological interventions within the applied strength and conditioning environment.

Concerning the qualitative nature of the work, the present investigation is effective in identifying specific strategies which are used in strength and conditioning and also the rationale for using such strategies in relation to developing confidence, regulating arousal or facilitating skill acquisition. Such a question was answered using a diverse sample with regard to experience and geographical location. However the sample in question was small and whilst providing detailed responses, caution is warranted if generalising the findings. Nevertheless, the present work supports previous quantitative research (43) which effectively quantified psychological skill use within strength and conditioning with regard to the most prevalent strategies used and important psychological constructs. Future work would be advised to examine the knowledge base on which strength and conditioning coaches base their psychological practice.

PRACTICAL APPLICATIONS

The findings of the present research provide encouraging direction as the strategies which are most frequently prescribed by strength and conditioning coaches. This provides direction in targeting specific strategies which can be further developed through continuing professional development and provides guidance towards techniques applicable within the strength and conditioning domain. The range of strategies used by the practitioners is indicative of those which could be classified as cognitive strategies, or as behavioral strategies. The thematic clustering of strategies is indicative of a triadic model where the key concepts within strength and conditioning practice appear to relate to the need to regulate arousal, the importance of shaping confident athletes, and, albeit to a lesser extent, the use of attentional focusing techniques to facilitate skill acquisition. It is pertinent to

862 highlight such areas with scope to guide professional development towards the specific
863 areas. The particular relevance of such areas is supported in the psychology chapter within
864 the *Essentials of Strength and Conditioning* (5), in which emphasis is provided to arousal
865 regulation, motivation, and attentional focusing (22) and more recently, and extensively, in
866 the text specifically detailing the use of psychological skills training within strength and
867 conditioning (38). It is therefore particularly pertinent to reinforce such concepts within the
868 development of strength and conditioning practitioners. Such development programs could
869 be in the guise of case studies or using simulated scenarios that could provide inexperienced
870 practitioners with focused experiences to develop discipline specific skill sets. Whilst the
871 present research has evidenced the use of psychological interventions within strength and
872 conditioning, it is important to consider that the importance to be flexible in meeting the
873 individual training needs (54). Nevertheless, the present work has potential benefits for the
874 strength and conditioning community through providing direction towards a suitable skill
875 set for the coach practitioner to possess.

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